E-120: Principles of Engineering Economics

Midterm Exam I
Feb 28, 2007

Name: _____   (please print)

SID: _____

• Clearly state all the formula and mathematical expressions that are needed to solve the problems.
   No credit will be given to numerical answers without the proper setup (except 2.a) .

• Answer each of the following questions in the space provided. If you need more space to show major computations you performed to obtain your answer for a particular problem, use the back of the preceding page.

• Present your work in an organized and neat fashion.

Good Luck!

Problem	1 (25)	2 (30)	3 (20)	4 (25)	Total (100)
Score					

Part 1: Concepts. (25 points, 5 each)

E_ 1.1) Which of the following statements is **False** for a dealer market?

A dealer market is a secondary market.
Nasdaq is a dealer market. (NSE auction market)
Dealers sell and buy at their own risk.
A dealer holds an inventory of the particular securities.
A Dealer is to match those who wish to sell with those who wish to buy.

C_ 1.2) What of the following statements for financial statements are **TRUE**?
Cash flow from assets (CFFA) cannot be negative.
Book value cannot be larger than market value.
Depreciation is a noncash item.

I only
II only
III only
I and III
II and III

A_ 1.3) Which bond would most likely posses the **LEAST** degree of interest rate risk?

A. 12% coupon rate, 10 years to maturity
B. 8% coupon rate, 10 years to maturity
C. 12% coupon rate, 30 years to maturity
D. 8% coupon rate, 20 years to maturity
E. 12% coupon rate, 20 years to maturity

C_ 1.4) For bonds with the same coupon rate, maturity and face value, which of the following features make a bond **MORE** valuable?
Put provision (bond holder can force the company to buy it back)
Call provision (The company can force bond holder to sell it back)
Convertible bond (bond holder can convert it into a stock)

I only
II only
I and III
II and III
I , II and III

B_ 1.5) What of the following statement is **FALSE** for EAR and APR?

APR is the quoted interest rate.

For a fixed APR, the interest rate is compounded monthly.

For a fixed APR, EAR has an upper bound.

EAR can be equal to APR.

EAR is the real interest rate if the money is compounded annually.

Part 2: Calculations.

(30 points) You are given the following income statement in 2005 of a firm. (all numbers are $ in millions)

Net Sales	10,000
Cost of goods old	7,000
Depreciation	600
Earnings before interest and taxes	2,400
Interest paid	600
Taxable income	1,800
Taxes	720
Net income	1,080
Addition to retained earnings	648
Dividends paid	432

a. (5 points) Complete the balance sheet of the firm

	2004	2005		2004	2005
Cash	1,000	1,100	Accounts payable	1,000	1,200
Accounts receivable	1,500	1,650	Notes payable	2,500	3,050
Inventory	2,000	2,200	Total	3,500	4,250
Total	4,500	4,950	**Long-term debt**	6,000	5,602
Net fixed assets	6,500	7,050	Common stock	1,000	1,000
			Retained earnings	500	1,148
Total assets	11,000	12,000	**Total liabilities and owner's equity**	11,000	12,000

b. (4 points) What is the firm's operating cash flow for 2005?

OCF = EBIT + Depreciation – Taxes = 2,400+600-720=2,280

c. (4 points) What is the firm's net capital spending for 2005?

Net Capital Spending=Ending fixed asset-Beginning fixed asset+ Depreciation
=7,050-6,500+600=1,150

(5 points) What is the firm's change in net working capital for 2005?

Change in NWC=Ending WC-Beginning WC=(4,950-4,250)-(4,500-3,500)
= - 300

(4 points) What is the firm's cash flow from assets for 2005?

CFFA = OCF – Net Capital Spending – Change in NWC
=2,280-1,150-(-300)=1,430

(4 points) What is the firm's cash flow to creditors for 2005?

Cash flow to creditors = interest - new net borrowing
= 600 - (5,602-6,000) = 998

(4 points) What is the firm's cash flow to shareholders for 2005?

Cash flow to shareholders = Dividends – new equity raised
= 432 – (1,000 -1,000) = 432

3. **(20 points)** Your rich uncle has recently passed away and left you an inheritance in the next 30 years. You will receive $2,000 per year from year 5 through year 10, $5,000 per year from year 11 through year 20, and $3,500 per year from year 21 to year 30. At a rate of 7 percent compounded annually, what is the present value of your uncle's generosity?

PV = PV of first 6 payments + PV of next 10 payments + PV of last 10 payments
= 2000*(1-(1/1.07)^6)/.07*(1/(1.07)^4) + 5000*(1-(1/1.07)^10)/.07*(1/(1.07)^10) +
3500*(1-(1/1.07)^10)/.07*(1/(1.07)^20)
=7272.74 + 17852.16 + 6352.59
= 31477.5

4. **(25 points)** Suppose that you hold a bond from Petty Inc. The bond is a 10% coupon bond with the maturity in 20 years. The bond makes annual payments and the YTM of this bond is 8%.

a. (13 points) What is the price of the bond? Is it a premium bond or discount bond?

PV = 0.1*1000*(1-(1/1.08)^20)/.08 + 1000/1.08^20= 1196.363

Premium bond

b. (12 points) If you hold this bond to maturity and deposit immediately all coupons received to a saving's account with interest rate 4% annually. How much in total you will receive in the 20th year?

FV = 1000 + .1*1000*((1.04)^20 -1)/.04 = 3977.808

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